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UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant: Otter
Serial No.: 09/927,274
Filed: 8/10/01
Group Art Unit: 3742
Examiner: Flanigan, Allen J.
Title: BLACK COATED LAYER HEAT EXCHANGER

Box AF
Assistant Commissioner of Patents
Washington, D.C. 20231

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APPEAL BRIEF

Dear Sir:

Subsequent to the filing of the Notice of Appeal on October 23, 2002, Appellant hereby submits its brief. The Commissioner is authorized to charged Deposit Account No. 50-1482 in the name of Carlson, Gaskey & Olds, P.C. the \$320.00 appeal brief fee. Any additional fees or credits may be charged or applied to Deposit Account No. 50-1482 in the name of Carlson, Gaskey & Olds, P.C.

REAL PARTY IN INTEREST

The real party in interest is Carrier Corporation, the assignee of the entire right and interest in this Application.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-5, 21 and 22 stand finally rejected under 103(a).

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STATUS OF AMENDMENTS

All amendments have been entered.

SUMMARY OF THE INVENTION

As illustrated in Figure 4, this invention relates to a method for making a heat exchanger 14 of a furnace system. The method includes the step of applying a layer of an oxidizable material 26 on an inner surface 28 and an opposing outer surface 30 of the heat exchanger 14. The method further includes the step of oxidizing the layers of oxidizable material 26 to form a layer of dark material having a high emissivity on each of said inner surface 28 and the outer surface 30 of the heat exchanger 14. This is advantageous as the emissivity and efficiency of the heat exchanger 14 increases when both the inner surface 28 and the opposing outer surface 30 of the heat exchanger 14 includes a layer of oxidizable material. By increasing the efficiency of the heat exchanger 14, the size of the heat exchanger 14 can be reduced. This method is recited in claim 1.

Dependent claim 3 further claims that the step of oxidizing the layers of oxidizable material 26 includes employing an oxidizing alkaline solution. Dependent claim 21, which depends on claim 3, further adds the step of spraying the oxidizable alkaline solution on the layers of oxidizing material 26. Dependent claim 22, which also depends on claim 3, adds the step of immersing the heat exchanger 14 in oxidizing alkaline solution.

ISSUES

- A. Are Claims 1-5, 21 and 22 properly rejected under 35 U.S.C. 103(a) based on Smith, Jr. in view of Thery et al.?
- B. Is Claim 3 properly rejected under 35 U.S.C. 103(a) based on Smith, Jr. in view of Thery et al.?
- C. Is Claim 21 properly rejected under 35 U.S.C. 103(a) based on Smith, Jr. in view of Thery et al.?
- D. Is Claim 22 properly rejected under 35 U.S.C. 103(a) based on Smith, Jr. in view of Thery et al.?

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GROUPINGS OF CLAIMS

- A. The rejection of Claims 1-5, 21 and 22 is contested.
- B. The rejection of Claim 3 is separately contested, that is, the rejection of the Claim does not stand or fall with the rejection of the other Claims.
- C. The rejection of Claim 21 is separately contested, that is, the rejection of the Claim does not stand or fall with the rejection of the other Claims.
- D. The rejection of Claim 22 is separately contested, that is, the rejection of the Claim does not stand or fall with the rejection of the other Claims.

PATENTABILITY ARGUMENTS

- A. **The rejection of Claims 1-5, 20 and 21 under 35 U.S.C. 103(a) is improper.**

The Examiner finally rejected Claims 1-5, 21 and 22 over Smith, Jr. (U.S. Patent No. 3,305,011) in view of Thery et al. (U.S. Patent No. 4,859,713). Smith discloses a radiator 24 with radiant surfaces 80 and 82 coated with a highly emissive material. As shown in Figure 5, the radiant surfaces 80 and 82 are on the exterior surface of the radiator 24. Surface 82 is an exterior of a tubing, and surface 80 is an exterior of a portion that connects the tubings. Thery discloses the surface oxidation of copper deposits 13c at high temperatures in an oxidation atmosphere. The surface oxidation transforms the copper deposits 13c into black copper oxide. The Examiner argues that it would be obvious to provide the black copper oxide surface of Thery on the radiant surfaces 80 and 82 of the radiator 24 of Smith.

The present invention is patentable and strikingly different from the combination of Smith and Thery. As described by the claims, the present invention provides a method for making a heat exchanger of a furnace system comprising the steps of:

- applying a layer of an oxidizable material on an inner surface and an opposing outer surface of said heat exchanger; and
- oxidizing said layers of oxidizable material to form a layer of dark material having a high emissivity on each of said inner surface and said outer surface.

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[See Claim 1]. Claims 1-5, 21 and 22 of the present invention all share this same or similar feature. [See Claims 1-5, 21 and 22].

Appellant's claims are not obvious as the combination of Smith and Thery does not disclose or suggest Appellant's claims. Appellant's claims require the step of applying a layer of oxidizable material on two opposing surfaces of a heat exchanger: both the inner surface and the outer surface. As shown in Figure 5 of Smith, the highly emissive material is only applied to one side of the heat exchanger 24, the outer radiant surfaces 80 and 82. Figure 5 illustrates that the radiant surfaces 80 and 82 are both on the same side of the heat exchanger 24, which is the outer side of the heat exchanger 24. The opposing inner surfaces of the radiator 24 are not disclosed or illustrated as being coated with a highly emissive material. Neither Smith nor Thery disclose the step of applying a layer of oxidizable material to both the inner and outer surface of a radiator. If Smith and Thery were combined, the combination would not disclose or suggest applying oxidizable material on both the inner and outer surfaces of a heat exchanger.

Additionally, Appellant's claims are not obvious because applying oxidizable material to both the inner surface and the opposing outer surface of the heat exchanger as required by Appellant's claims provides additional advantages. As disclosed in the patent application as originally filed, coating both the inner surface and the outer surface of the heat exchanger increases the emissivity of the heat exchanger, and therefore heat exchanger efficiency. The increase in the efficiency resulting from coating both the inner surface and the outer surface of the heat exchanger also allows for a reduction in the size of the heat exchanger. Appellant's claimed invention provides this additional advantage, and Appellant's claims are not obvious.

Finally, Thery does not disclose applying a layer of an oxidizable material on any surface. Thery discloses applying copper deposits 13a, 13b and 13d. As shown in the Figures, the copper deposits 13a, 13b and 13c each have a shape and only cover a portion of the device. Therefore, the copper deposits 13a, 13b and 13c do not form a layer as required by Appellant's claims. If Thery was truly combined with Smith, only a portion of radiator 24 would be covered with copper deposits.

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Appellant's claims require that the oxidizable material is applied as a layer. Appellant's claims are not obvious.

B. The rejection of Claim 3 under 35 U.S.C. 103(a) is improper.

The rejection of Claim 3 is separately contested from the rejection of Claims 1 et al.

Claim 3 sets forth a method for making a heat exchanger further including the step of oxidizing layers of an oxidizable material with an oxidizing alkaline solution. Neither Smith nor Thery discloses or suggests employing an oxidizing alkaline solution to oxidize an oxidizable layer. As disclosed in column 7, lines 3 to 14, Smith discloses applying a layer to a radiator 24 by anodizing, brushing, spraying, rolling or electrical deposition; Smith does not disclose oxidizing the layer with an oxidizing alkaline solution. In column 11, lines 1 to 7 of Thery, Thery discloses oxidizing copper deposits at a high temperature in an oxidizing atmosphere, but also does not disclose employing an oxidizing alkaline solution. Neither reference discloses or suggests a method for making a heat exchanger including the step of oxidizing a layer with an oxidizing alkaline solution, and claim 3 is not obvious.

C. The rejection of Claim 21 under 35 U.S.C. 103(a) is improper.

The rejection of Claim 21 is separately contested from the rejection of Claims 1 et al. Claim 21 sets forth a method for making a heat exchanger including the step of spraying an oxidizing alkaline solution on the layers of the oxidizing material. Neither Smith nor Thery discloses or suggests the step of spraying an oxidizing alkaline solution on layers of oxidizing material. Smith discloses applying a coating to a radiator 24 by anodizing, brushing, spraying, rolling or electrical deposition, but does not disclose oxidizing a layer by spraying an oxidizing alkaline solution. In column 11, lines 1 to 7, Thery discloses oxidizing copper deposits at a high temperature in an oxidizing atmosphere. Neither reference discloses or suggests a method for making a heat exchanger further including the step of spraying an oxidizing alkaline solution on the layers of the oxidizing material, and claim 21 is not obvious.

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D. The rejection of Claim 22 under 35 U.S.C. 103(a) is improper.

Finally, the rejection of Claim 22 is separately contested from the rejection of Claims 1 et al. Claim 22 sets forth a method for making a heat exchanger including the step of immersing a heat exchanger in an oxidizing alkaline solution to oxide a layer. Neither Smith nor Thery discloses or suggests the step of immersing a heat exchanger in an oxidizing alkaline solution. Smith discloses applying a coating to a radiator 24 by anodizing, brushing, spraying, rolling or electrical deposition, but does not disclose oxidizing a layer by immersing the layer in an oxidizing alkaline solution. Thery discloses oxidizing copper deposits at a high temperature in an oxidizing atmosphere. Neither reference discloses or suggests a method for making a heat exchanger further including the step of immersing a heat exchanger in an oxidizing alkaline solution, and claim 22 is not obvious.

CLOSING

For the reasons set forth above, the rejection of all claims is improper and should be reversed. Appellant respectfully requests such an action.

Respectfully Submitted,

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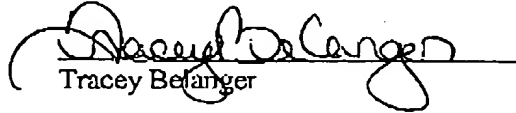
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Dated: December 18, 2002

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CERTIFICATE OF FACSIMILE

I hereby certify that the enclosed Appeal Brief is being facsimile transmitted to the U.S. Patent and Trademark Office, Group Art Unit 3742, After Final facsimile no. (703) 872-9303 on this 18th day of December 2002.


Tracey Belanger

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CLAIM APPENDIX

1. A method for making a heat exchanger of a furnace system comprising the steps of:
applying a layer of an oxidizable material on an inner surface and an opposing outer surface of said heat exchanger; and
oxidizing said layers of oxidizable material to form a layer of dark material having a high emissivity on each of said inner surface and said outer surface.
2. The method as recited in claim 1 wherein the step of applying said layers of said oxidizable material includes applying said layers of oxidizable material electrochemically.
3. The method as recited in claim 1 wherein step of oxidizing said layers of oxidizable material includes utilizing an oxidizing alkaline solution to oxidize said layers of oxidizable material.
4. The method as recited in claim 1 wherein said layers of oxidizable material are copper.
5. The method as recited in claim 4 wherein said layers of oxidizable material are oxidized to cupric oxide.
21. The method as recited in claim 3 further including the step of spraying said oxidizing alkaline solution on said layers of oxidizing material.
22. The method as recited in claim 3 further including the step of emerging said heat exchanger with said layers of oxidizable material in said oxidizing alkaline solution.

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